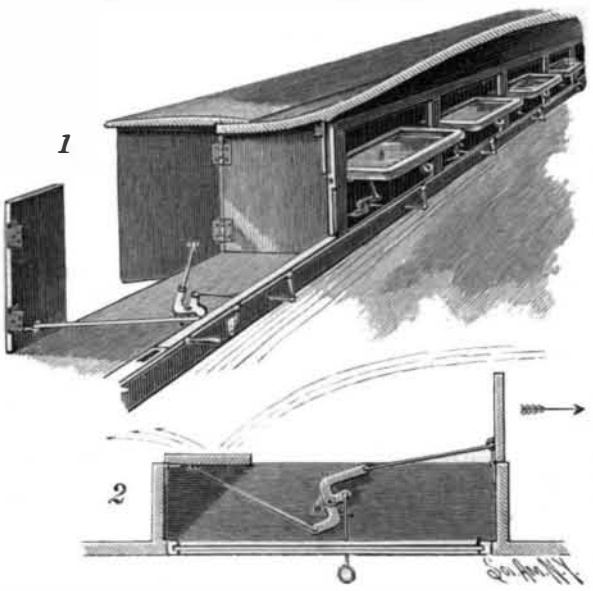
A NOVEL CAR AWNING VENTILATOR.

To insure the improved ventilation of a railway passenger car, and prevent the entry of cinders and dust, as well as to prevent draught blowing through the ventilators down upon the passengers, the improvement shown in the accompanying illustration has been devised and patented by Charles A. Bennett, of No. 32 West Hamilton Place, Jersey City, N. J. Fig. 1 represents the application of the improvement on a portion of one side of a car roof, there being two deflecting wings hinged on the ends of the window casings, and these wings being pivotally connected by links on their inner faces with the arms of a lever fulcrumed on



BENNETT'S CAR AWNING VENTILATOR.

a plate set in the window casing. An arm of this lever is engaged by a handle sliding in the sill, and the outer end of the handle may be moved by means of a rod extending along under the windows, whereby all of the wings on one side of a car may be turned simultaneously, the three-armed levers thus actuated causing the wings on one side of each window to swing outward, while its opposite wing swings inward, longitudinally of the car, closing part of the window casing. Thus, as will be seen by Fig. 2, when the car is moving as indicated by the arrow, the wing that is swung outward deflects the strong air currents over upon the opposite closed wing, and prevents cinders, dust, and an objectionable draught from passing in at the window.

TO RING A BELL WITHOUT SWINGING IT.

The illustration represents an improvement whereby bells on churches, schools, etc., may be rung without causing special strain of the tower, belfry, or any part of the structure by which the bell is supported. The improvement has been patented by Rev. John H. Strain, of Gentryville, Ind. The bell is rigidly secured at its top in the usual belfry or tower, so that the bell will remain stationary instead of swinging when rung. On the under side of the clapper is an eye connected with the ends of oppositely extending chains which are connected at their other ends with the ends of a curved

STRAIN'S BELL RINGING MECHANISM.

arm attached at its middle to a shaft journaled in bearings immediately below. One end of the curved arm is weighted, to hold it when at rest in the position shown in the illustration, and the other end of the arm is connected with a downwardly extending rope, by pulling upon and releasing which the clapper strikes and sounds the bell alternately on opposite sides. As will be seen, a proper and full sounding of the bell is insured by this mechanism, which imparts a swinging motion to the clapper, and the building is not injured by jarring, as so frequently happens with heavy bells.

A HOTEL at Nice, France, advertises a special race track for the exclusive use of its cycling patrons.

Correspondence.

A Simple Method of Regulating the Vacuum in X Ray Tubes.

To the Editor of the SCIENTIFIC AMERICAN:

A little point which I have found out about focusing Crookes tubes may be of interest, as I have not seen it in print. In use, the vacuum of the tube runs up, necessitating increasing the power of the coil to get the same results, and after this increase becomes impracticable, heating the tube is resorted to. This is apt to destroy the tube by cracking it, unless very carefully done, and, even if safely done, it soon loses its power to restore the tube. It occurred to me that the increase of vacuum was due to the absorption of gases by the platinum anode, and, knowing that the negative pole threw off gas, reversed the polarity of the tube. After working it in this way for half an hour, the tube was restored to full power, and I have practiced this process for the past two months with perfect success and without injury to the tube. After an hour's run with the X rays I reverse it as above, and it is ready for another hour's run. The coil should be cut down in power when reversed, as there is danger of disintegrating the platinum and depositing it on the glass. I cut out half the battery power. The tube makers recommend that very high vacuum tubes be sent them to have air admitted and repumped, but my method appears preferable, and, besides, saves their charge of three dollars and the time. RALPH MCNEILL.

New York, August 19, 1896.

Modern Practice in Interior Wiring.

In the course of his paper on the "Evolution of Interior Conduits from the Electrical Standpoint," before the National Electric Light Association at New York, recently, Luther Stieringer made the following statement:

The best experience of the past fifteen years in interior wiring has demonstrated the following facts:

First—Indiscriminate wiring with staples is universally condemned.

Second—Cleat wiring is admissible in exposed work where the circumstances admit, but not in any concealed work.

Third—Wires embedded in plaster, depending on the insulation only for protection, are condemned.

Fourth—Lead covered wires are also condemned, except where protected in a conduit.

Fifth—Wires in mouldings do not afford mechanical or chemical protection, and are only admissible in surface work.

Sixth—Wires carried in plaster, and covered with split or zinc tubes to prevent injury by trowels, are condemned.

Seventh—Glass or porcelain insulators can only be utilized in special cases of exposed work.

Eighth—Paper tubes do not afford absolute mechanical and chemical protection.

Ninth—Insulated tubes covered with a thin coating of brass or other metals do not afford absolute mechanical and chemical protection, but, in exposed work, they are, to a certain extent, admissible.

Tenth—Woven fabric conduit does not afford absolute chemical and mechanical protection.

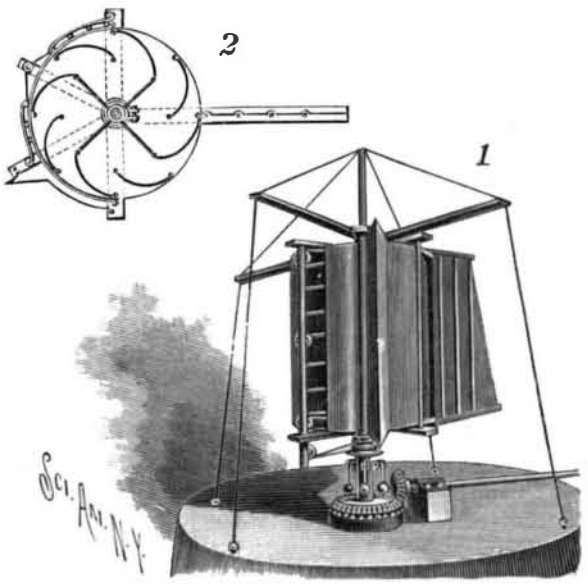
Eleventh—Heavy insulating covering, integral with the insulation, offers no absolute protection against mechanical and chemical injury, and is analogous to rubber tubing for gas distribution installed throughout a building.

Twelfth—Concentric wiring is practiced in England with satisfactory results, but it is not in use in the United States. It offers many possibilities in the direction of a solid and fixed system.

Thirteenth—Paper lined iron or steel pipes, known as "iron armored conduit," "builders' tube," "armorite," "Clifton," and plain iron or steel pipe, are the only conduits that can afford absolute security against mechanical and chemical injury and assure permanence.

A NEW SELF-REGULATING WIND WHEEL.

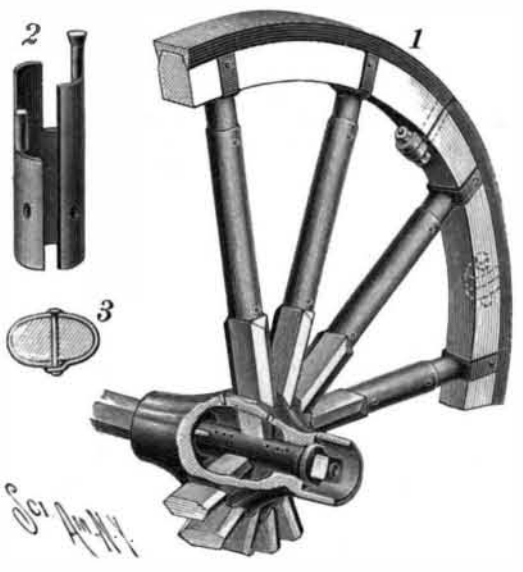
The wind wheel shown in the illustration is designed to quickly adapt itself to the variations of force and direction of the wind, and maintain a practically even speed and power under great changes in wind velocity. It has been patented by John T. Shilling, of Fisher's, N. Y. Fig. 1 is a front view of the wheel, portions being broken away to show its construction, and Fig. 2 a horizontal section. The upper end of the central shaft is braced by guy lines and cross arms, and rotating on this shaft is a tubular shaft whose lower end rotates on ball bearings and has an annular beveled gear by means of which the power of the wheel may be utilized by means of another similar gear on a horizontal shaft. Upon the tubular shaft are upper and lower disks between which are held sails, blades, and supplemental blades, attached to vertical rods, and all of canvas or other flexible material. Rotating upon the tubular shaft, and having a bearing upon the central shaft, is an auxiliary frame carrying bars which extend beyond the circumference of the wheel, as shown in Fig. 2, and support a vane. On the opposite end of this frame, supported by stay rods and horizontally curved bars, are held damper curtains adapted to be automatically moved toward and from each other, to more or less restrict the opening for the passage of wind to the wheel. The rear edges of the curtains are attached to spring rollers and their adjacent free edges to ropes which extend over pulleys and down a hollow standard to connections with a drum below, mounted loosely on the tubular shaft. There are pivoted weighted arms on this drum, and, as they swing outward with the increased velocity of the wind, the drum is drawn into frictional contact with a collar, and is rotated to pull upon the ropes and draw the damper curtains toward each other, thus cutting off some of the wind from the wheel, the spring rollers separating the curtains more or less as the frictional contact of the drum with the collar is reduced, whereby the speed of the wind wheel will be kept practically uniform.



SHILLING'S WIND WHEEL.

AN IMPROVED VEHICLE WHEEL.

The illustration represents an improved construction of the tire, hub, axle box and spokes of a vehicle wheel, by which it is designed that the tire may be tightened should the rim or felly shrink, and the spoke will be protected from injury by collisions, while the hub will be rendered stronger and more durable than usual, and a ready means is afforded for lubricating the axle spindle The improvement has been patented by John S. Court, of Springdale, Tenn. Fig. 1 represents a portion of a wheel made according to this invention, a part of the hub being broken away, Fig. 2 showing a form of spoke sleeve especially designed for repairing, and Fig. 3 showing how the sleeve is attached to the spoke. The tire is flanged and beveled, and fits over a felly which is exteriorly beveled, corresponding to the inner bevel of the tire. The ends of the tire have inwardly extending lugs which abut and are fastened together by nuts and bolts, whereby the tire may be tightened should the felly shrink. The hub is of metal in one piece and at its central



COURT'S VEHICLE WHEEL.

portion is a series of tubular or hollow arms which form a central support for the axle box, there being perforations to admit oil to the axle spindle, and the chamber surrounding it containing cotton waste. The spokes are fastened in the tubular arms of the hub, and the outer end of each spoke is mortised in the felly, the outer end of the spoke being surrounded by a metal sleeve with ears to engage the front and back of the felly and the flange of the tire. A second sleeve also surrounds each spoke, being attached at one end to the outer end of the tubular hub arm from which the spoke extends and at the other end to the outer sleeve. A longitudinally split sleeve, as shown in Fig. 2, is used at the outer end of the spoke for repairing purposes.

Tesla Says Roentgen Rays are Streams of Very Small Missiles.

According to statements recently published, the Roentgen rays are now declared, by Nikola Tesla, to be material particles. Mr. Tesla states that the electrical conditions within the tube from which the rays issue produce absolute particles. He further says he can feel the effects of these particles striking against his eye, and has noted the sensation produced when they come in contact with his brain. He says:

"There is little doubt now that a cathodic stream within a bulb is composed of small particles of matter thrown off at great velocity from the electrode. The velocity probably obtained can be estimated, and fully accounts for the mechanical and heating effects produced by the impact against the wall or obstacle opposed to the bulb. It is furthermore an accepted view that the projected lumps of matter act as inelastic bodies, like innumerable infinitesimal bullets. It can be shown that the velocity of the stream may be as much as 100 kilometers a second, or even more. But matter moving with such great velocity must surely penetrate great thicknesses of the obstruction in its path, if the laws of mechanical impact are at all applicable to a cathodic stream.

"I have so much familiarized myself with this view that, if I had no experimental evidence, I would not doubt that some matter is projected through the thin wall of a vacuum tube. The exit from the latter is, however, the more likely to occur, as the lumps of matter must be shattered into still much smaller particles by the impact. From my experiments it appears that the lumps or molecules are indeed shattered into fragments or constituents so small as to make them lose entirely some physical properties possessed before the impact.

"The matter composing the cathode stream is," continues Mr. Tesla in his letter, "reduced to matter of some primary form heretofore not known, as such velocities and such violent impacts have probably never been studied or even attained before these extraordinary manifestations were observed. The important fact pointed out early by Roentgen and confirmed by subsequent researches, namely, that a body is the more opaque to the rays the denser it is, cannot be explained as satisfactorily by any other assumption than that of the rays being streams of matter, in which case such simple relation between opacity and density would necessarily exist.

"This relation is the more important in its bearing upon the nature of the rays, as it does not at all exist in light-giving vibrations, and should consequently not be found to so marked a degree and under all conditions with vibrations presumably similar to and approximating in frequency the light vibrations. An almost crucial test of the existence of material streams is afforded by the formation of shadows in space at a distance from the bulb. Such shadows could not be formed under the conditions described except by streams of matter."

Music and Baldness.

An English statistician has recently been engaged in an original task, that of studying the influence of music on the hair. The investigator establishes, in the first place, that the proportion of bald persons is 11 per cent for the liberal professions in general, with the exception of physicians, who appear to hold the record for baldness, which is 30 per cent. Musical composers do not form an exception to the rule, and baldness is as frequent among them as in the other professions. But it is with instrumental performers that the influence of music makes itself felt, and in two opposing directions. Thus, while stringed instruments prevent and check the falling out of the hair, brass instruments have the most injurious effects upon it. The piano and the violin, especially the piano, have an undoubted preserving influence. The violoncello, the harp, and the double bass participate in the hair-preserving qualities of the piano. But the hautboy, the clarinet, and the flute have only a very feeble effect. Their action is not more than a fiftieth part as strong. On the contrary, the brass instruments have results that are deplorable. . . . The cornet-a-piston and the French horn act with surprising surety and rapidity; but the trombone is the depilatory instrument par excellence. It will clear the hair from one's head in five years. This is what the author calls "baldness of the fanfares," which rages with special violence among regimental bands.

THE MODERN REVOLVER—THE EVOLUTION OF A TYPICAL INVENTION.

BY E. J. PRINDLE.

There is a popular impression that many inventions are produced in a complete and perfect state by one supreme effort of some genius. But, on inquiring into the history of even the most simple device which has been contrived for the use or pleasure of mankind, it will almost invariably be found that it had a most elemental and simple beginning, and that its growth from that state was by a series of short steps, each effected only after prolonged efforts and many failures,

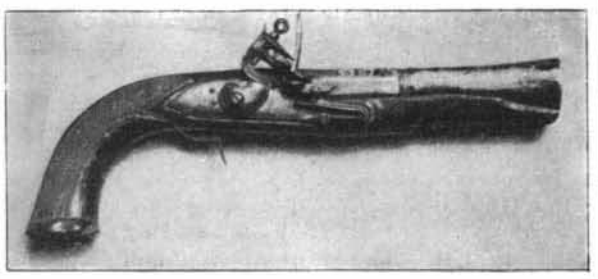


Fig. 1.—OLD FLINT LOCK PISTOL FOUND ON BATTLEFIELD OF NEW ORLEANS.

and that in many cases there were intervals of centuries between the steps.

The origin of the plow, for instance, is lost in antiquity, and, as far back as history goes, the Egyptians dragged the forked stick to till the earth and find a lodgment for the seed, and at best it was only a scratch that was produced. In spite of all the thought which was spent on the subject, it was not until the present century that the iron plow was created, and of such strength and form that it would dig down and overturn the sod and stand the blows of the rocks in its path.

Before the Christian era machinery operated by steam was used to open the doors of temples and even to propel a deity on his throne along the ground. But it was two thousand years before the steam engine was produced in a sufficiently practical form to be generally used.

One of the clearest examples of this law of evolution in inventions is the principal part of the modern revolver; namely, the cylinder which carries the cartridges. Without reference to the other features of the revolver, notice how clearly the steps can be traced between the five forms ending in the modern revolver cylinder.

In Fig. 1 is shown the old single barrel, muzzle loading pistol. With this form but one shot could be fired without reloading, and a man after one shot was, in case of a failure, at the mercy of his enemy. The engraving represents a pistol found on the battlefield of New Orleans and now in the United States National Museum, Washington. The first step from this form produced that shown in Fig. 2, in which several barrels in the same plane were discharged in succession by a firing pin which was struck by the hammer and which was pointed at each cap in succession. But it was evident that a very cumbersome weapon would be produced if more than two or three barrels were used. To obviate this difficulty the barrels were grouped around a center and the hammer made to rotate around the circle step by step as each barrel was fired. This form is shown in Fig. 3.

Fig. 2.—MARSTON PISTOL IN UNITED STATES PATENT OFFICE.

Fig. 4.—ALLEN "PEPPERBOX" (CAP SHIELD DISPLACED).

Fig. 3.—LEONARD REVOLVER IN THE UNITED STATES PATENT OFFICE.

Fig. 5.—COLT'S ARMY REVOLVER.

Use, however, developed disadvantages in this form. It was difficult to put the caps on the nipples, and the hammer was necessarily of awkward and weak construction. Efforts to remove these defects resulted in the form of a revolver shown in Fig. 4. The barrels, still grouped around a center, were caused to revolve while the hammer remained stationary. This construction, however, was still unsatisfactory. The whole structure was necessarily weak, and there were six barrels extending the whole length of the pistol from the hammer forward.

Further efforts produced the modern revolver shown in Fig. 5, in which a rotatable cylinder carries the cartridges and is only of sufficient length to accommodate them. A single barrel carries the balls after they leave the cylinder, and the revolver is reduced to its highest, strongest and simplest form.

How infinitely greater would the chances be in favor of a man armed with the latest form of revolver compared with those of a man defending himself with the earliest type of pistol! With the latter but one shot was possible, and it was not at all certain that the charge would be fired when the trigger was pulled; while with the former six practically certain shots could be fired in most rapid succession.

Hundreds of inventors have striven for more than four centuries to produce a weapon having the advantages of the revolver in its present form, and each has added his mite to the final result. A full realization of the difficulties and labor with which each new fact is wrested from the unknown darkness and brought out into the light where it can be used, leads us to honor that perseverance and wisdom which puts us in the possession of any new thing.

Aphasia in Polyglots.

In a recent number of the Revue de Medecine, Dr. Pitres details a number of interesting observations with reference to the peculiarities of aphasia as it occurs among patients who were able to speak fluently more than one language. It appears that such patients do not become aphasic in the same degree for all the languages which they speak. At first, as a rule, there is general aphasia, then, as improvement occurs, the patient is able to understand and then to speak that language which he has known longest and with which he was most familiar. The capacity for use of the other less familiar languages was acquired later. Such a conclusion does not of course imply the existence of different centers for the different languages, but is merely an illustration of the fact that qualities and capabilities which are acquired latest are most easily lost or impaired by any condition which interferes with the nervous structures which underlie them.—Lancet.

Prof. Andrée to Return.

Prof. S. A. Andrée, according to reports received at Christiania on August 21, told Capt. Sverdrup, of the Fram, who visited the aeronaut, that it was now too late to make the proposed ascent, and that he would probably soon return to Spitzbergen, and make another effort to reach the North Pole in a balloon next April. This confirms the Berlin dispatches of August 18, which state that Sir William Conway met Andrée on August 10, and that he was doubtful of success even then.

DR. J. WALTER FEWKES will again conduct explorations for the Smithsonian Institution among the Pueblos of Arizona. He left Washington for a three months' expedition, on May 30, accompanied by Dr. Walter Hough, of the National Museum.